Case Study

Sitedrive and Connected Inventions boost concrete curing process and enhance construction site efficiency with IoT monitoring solution connected to the 0G Network

The Challenge

Sitedrive needed a solution to capture and share data-driven insights to reduce construction lead times by monitoring conditions to optimise concrete curing.

The Solution

Sitedrive partnered with Connected Inventions to install IoT-enabled remote monitoring devices, connected to the 0G Network, to detect indoor temperature and humidity levels to optimise concrete curing conditions indoor on construction sites.

The Results

Connected Inventions IoT solution lets Sitedrive customers:

- Monitor and enhance concrete curing conditions
- Accelerate standardize concrete drying times from between 12 weeks to 16 weeks, to 8 weeks to 10 weeks
- 2 months faster project with confidence to start interior-phase
- Data-driven scheduling optimise equipment hire

0G Network Operator

Connected Finland

Connected Finland operates the 0G Network across Finland and Estonia, providing an affordable, energy-efficient, simple network dedicated to connecting IoT sensors and devices.
https://www.connectedfinland.fi/

Solution Partner

Connected Inventions

Connected Inventions develop, manufacture, and deliver, high-quality IoT devices, software, and solutions that unlock the power of data-driven insights for multiple industries across more than 50 countries.
https://connectedinventions.com/

Customer

SITEDRIVE

Sitedrive is a Finnish construction software company with a mission to improve construction flow and enables data based assessments of ESG impact of construction.
https://sitedrive.com/

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Famous for its strength, durability, and versatility, concrete is used twice as much as any other building material in construction projects. A critical step to ensure safe, high-quality concrete is curing, the process of maintaining ideal ambient temperature and humidity to allow concrete to harden properly.

Finnish company, Sitedrive, knows construction. Since 2016, the business has invested in innovative solutions such as Sitedrive "Plan" and "Takt" to reduce construction lead times. Concrete curing is an unavoidable, time-consuming step in almost every building process.

Average cost per working day at a construction site is

~10,000 EUR

Did You Know ?

Maintaining a "Just Right" temperature conditions is critical to ensure concrete cures properly to reach its compressive strength?

While curing times vary due to the concrete's location, depth, and ultimate purpose, research shows the ideal average temperature to cure concrete thoroughly is by maintaining 55°F / 12°C for up to 28 days following the placement. (1) Concrete poured in conditions that are hot or cold need special curing treatments. If conditions are too cold, below 28°F / -4˚C, or too hot, 90°F / 32°C, concrete won't cure at all. (2) and (3) Insulated blankets, heaters, and plastic sheeting can warm concrete, while mist spraying, wet coverings, sunshades, and windbreaks can help cool concrete during curing.

Traditional methods to manage curing conditions require manual monitoring to measure temperature and humidity. Manual processes are time-consuming, expensive, and often imprecise. If the environment is too cold or humid, curing times extend with the site requiring placement of costly commercial heaters.

The Sitedrive team wanted a scalable, technology-based solution to improve the speed, accuracy, and cost of monitoring and optimising concrete curing conditions indoor. Specific requirements included regular monitoring of delicate temperature and humidity levels in harsh construction conditions with minimal human intervention and simple, low-cost, reliable network connectivity in a range of environments.

Building better with the IoT

Innovative solution provider Connected Inventions has specific expertise in creating viable IoT use cases to unlock operational business value.

The team designed an IoT solution for Sitedrive using the Connected Inventions AirWits temperature and humidity metering devices to monitor concrete curing conditions at construction sites remotely.

Battery-operated for up to five years without maintenance, a compact AirWits device is installed in each room of a construction site in minutes using double-sided tape or magnets. No special tools, skills, or technology is necessary to install and configure the device. The simplicity of installation and low-power, low-cost battery make the solution cost-effective.

Each device measures and sends temperature and humidity data wirelessly every 30 minutes across the 0G Network, powered by Sigfox 0G technology. The devices are configurable to capture and share condition data as often as five-minute intervals. Such frequency is ideal for construction sites where doors and windows are opened often.

The 0G Network is a global low-power, long-range network enabling low-cost, low-energy device connectivity for Massive IoT. As the 0G Network leverages radio technology, it overcomes many of the coverage limitations experienced by traditional solutions that rely on cellular networks or SIM cards, even for connectivity in difficult-to-reach environments such as basements, rural areas, and inside concrete structures.

The solution maps temperature and humidity information to a cloud-based data management platform that populates a visual dashboard site managers use to oversee construction projects. Aside from IoT data, the dashboard includes multiple construction process flows, details of teams on-site, costs, safety measures, and more.

The Sitedrive solution also features alerts, which notify site managers when conditions at the location don't meet optimal temperature and humidity thresholds. The alerts allow for quick corrective actions, including automated process flows such as cooling tower activation.

Sitedrive delivers a concrete advantage to building sites with the 0G Network

Sitedrive's IoT condition monitoring solution delivers fast, accurate, data-driven insights into curing conditions that let site managers react in near real-time when adverse curing conditions are detected. The benefits for construction companies, site managers, and end customers include:

- Improved project quality by monitoring and enhancing curing conditions
- Accelerate standardize concrete drying times from between 12 weeks to 16 weeks, to 8 weeks to 10 weeks
- 2 months faster project with confidence to start interior-phase
- Shortened contractor time on-site to perform time-consuming manual monitoring
- Efficient mitigation strategies and optimised hiring of heating and cooling equipment to meet specific site requirements
- Data-driven scheduling optimise equipment hire
- Happy customers who enjoy the benefits of considerable time and cost savings

> *In the construction industry, time is money. The longer a project takes to build, the higher the costs and the less happy the customer. Data-driven insights are invaluable to improving how our customers understand and manage time-sensitive decisions with expensive implications across complex value chains of contractors and sub-contractors. Monitoring temperature and humidity with IoT devices and the 0G Network lets us help site managers remove the guesswork around concrete curing conditions.*
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> ***Pekka Silen, Development Manager at Sitedrive***

> *With remote IoT monitoring of construction site conditions connected to the 0G Network, Sitedrive transforms how site managers monitor and manage the time and expense of concrete curing. The low cost, reliability, and simplicity of the 0G Network help ensure that every concrete pour is a cost- effective, efficient part of the construction process. The ease of connectivity also lets us add other devices that customers might need on-site, such as dust monitoring for occupational hygiene or renovation project quality management.*
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> ***Henri Hovi, Chief Technology Officer at Sitedrive***

> *Concrete curing is an ordinary part of every construction process that inevitably slows project completion, adding cost, complexity, and customer frustration. Sitedrive's creative use of the IoT to address this challenge with a cost-effective, simple condition monitoring solution is an inspiring example of how connecting compact low-power monitoring devices to the 0G Network modernises traditional processes, enabling extraordinary commercial outcomes at scale."*
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> ***Loic Barancourt, Chief Commercial Officer of UnaBiz***